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ABSTRACT

This study examined how the awarding of tenure affects senior professors' interests in teaching and research and whether effects are uniformly negative, positive or different depending on the task. A conceptual model was used that involved intrinsic interest and extrinsic rewards, work context, and individual background variables. Data were taken from the 1989 Survey Among College and University Faculty, a total sample of 5,450 faculty from 306 two-year and four-year American colleges and universities. The results of the study show that even after they have attained tenure themselves, faculty perceptions of which tasks are rewarded by tenure continue to influence their intrinsic interest in their professorial tasks. Moreover, the positive influence of tenure has approximately the same magnitude on tenured professors' primary interest in teaching as it does on their primary interest in research. To the extent that faculty perceive research is rewarded by the key gate-keeping academic reward of tenure, their preference for research over teaching increases. Similarly, to the extent that faculty perceive that teaching is rewarded in their departments by tenure, their preference for teaching increases rather than decreases. Professors' primary interests are strongly aligned with the missions of the institutions where they work. (Contains 36 references.) (JB)

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Extrinsic Rewards and Intrinsic Interest: The Influence of Tenure on Faculty Preference for Teaching or Research

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ASSOCIATION FOR THE STUDY OF HIGHER EDUCATION

This paper was presented at the annual meeting of the Association for the Study of Higher Education held at the Marriott City Center, Minneapolis, Minnesota, October 29 - November 1, 1992. This paper was reviewed by ASHE and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC collection of ASHE conference papers.

Extrinsic Rewards and Intrinsic Interest: The Influence of Tenure on Faculty Preference for Teaching or Research

This study is designed to test contrasting assumptions about the effects of extrinsic rewards on faculty interest in their work tasks. Different assumptions about the relationship between intrinsic and extrinsic motivation complicate many of the recent policy and theoretical discussions about rewards, professors, teaching, and research. Some observers suggest that professors do their jobs for the joy of it, and not for external rewards. Why else would such talented people work so hard for so much less remuneration than other similarly talented professionals? Increasing emphasis on material rewards would surely distract college and university faculty into pursuing further rewards, thereby reducing their interest in the pursuit and sharing of knowledge. In contrast, others imply that professors' interests and efforts are clearly influenced by external rewards. After all, faculty have modified their work habits in response to increased rewards for research since World War II.

Thus academic policy makers who wish to improve undergraduate education are faced with a dilemma: will an increase in external rewards for teaching decrease or increase professors' interest in teaching? It will be difficult to predict the effects of reward changes on professors' attitudes about teaching and research until we have a clearer understanding of the effects of current reward policies. As part of an effort to clarify this issue, this study addresses the the effects of the extrinsic reward of tenure on faculty interest in teaching and research.

The effects of tenure on professors' attitudes about their teaching and research tasks are particularly important for academic policy makers to understand. The career security embodied in tenure has important effects on whether or not a junior faculty member remains at an institution, or perhaps even in the academic profession (Bowen & Schuster, 1986). Since tenure serves both gatekeeping and socializing functions, faculty

perceptions of the degree to which research and teaching tasks contribute to attaining tenure may affect their attitudes and behavior long after they have achieved this status. On the other hand, since tenure is awarded only once and virtually ensures career security, tenured professors may feel free to pursue their own interests without feeling influenced by the requirements faced by their junior colleagues. What little evidence we have of the effects of tenure on faculty research productivity is mixed (Newmann, 1979): after they have attained tenure, faculty may no longer feel pressure to conform to its requirements and reduce research output (Holley, 1977), or they may continue to produce at pre-tenure levels (Orpen, 1982). There has been even less study of the effects of tenure on teaching effectiveness.[1]

This study addresses a gap by considering how tenure affects professors' interests in both teaching and research. Given renewed concerns that professors' research efforts may reduce their teaching quality, it is now particularly important to understand the degree to which tenure affects faculty preference for one activity over the other. This study focuses on faculty addresses the following questions:

> To what extent do tenured professors' perceptions about the degree to which teaching and research tasks are important for attaining tenure in their departments affect their interest in teaching and research? If tenure does have significant effects on senior professors' interests, are those effects uniformly positive, uniformly negative, or are the effects different depending on the task?

Conceptual Model

An individual's stated interest in work tasks may be motivated by at least three factors: the work environment, individual ascriptive and achievement characteristics, and external rewards. In this section, I define the main components of the basic model (shown in Figure 1). Then I outline two contrasting hypotheses about the effects of the reward of tenure on professors' interest in teaching or research. These hypotheses are

derived from the literatures on motivation and of faculty, teaching, research, and rewards.

Model Components

Intrinsic Interest and Extrinsic Rewards: Intrinsic motivation has been defined several ways by different industrial and organizational psychologists; this has led to confusion about how intrinsic interest can and should be distinguished from extrinsic rewards. "Advancement" and "recognition," for example, have been classified as intrinsic rewards in some studies and as extrinsic rewards in others (Dyer and Parker, 1975). Perhaps this is because some definitions posit that intrinsic motivation originates from internal needs and feelings that pre-exist a particular work situation (Wernimont, 1972; Slocum, 1971). Many theories of motivation however, including those tested in this study, posit that a persons' current intrinsic motivation is influenced by their past experiences, social context, and perceptions of extrinsic rewards. The dependent variable for this study, intrinsic *interest*, is defined as "derived directly from or inherent in the task or job itself--associated with the task or job" (Dyer and Parker, 1975). It is operationalized as faculty members' stated interest in and preference for teaching or for research.

Extrinsic rewards are defined as "derived from the environment surrounding the task or work--associated with the context of the task or job" (Dyer and Parker, 1975). Knowing whether or not an individual's reward is actually related to his or her job efforts is not as helpful for understanding motivation as knowing whether the individual **believes** that work effort influences the reward (Nadler and Lawler, 1977). This study focuses, therefore, on faculty members' perceptions of the degree to which teaching and research *tasks are important for earning tenure* in their departments.

Work Context: The colleges and universities where faculty are employed and the disciplines they practice may exert strong selection and socialization influences on a

professor's preference for teaching over research. Through attraction, selection, and attrition, institutions and departments may ensure that their members have similar interests and preferences (Schneider, 1987). During the five-to-seven year process of attaining tenure, a junior faculty member may be socialized by her institution or department, absorbing and adopting many of the values and attitudes of his or her peers (Merton, 1957).

Institution: Prior knowledge of individual college and university standards for tenure seems to have at least one very powerful indirect effect: only those already highly qualified and interested in doing research are selected by top research university departments (Finkelstein, 1984). Faculty, the other half of the employment equation, may also choose to seek employment at institutions where what is rewarded most closely resembles their own interests. Institution type has significant effects on the amount of time faculty report they spend on teaching and research (Blackburn, et. al, 1991a, 1991b). I would predict that faculty in research and doctoral-granting institutions are more likely to say they are primarily interested in research, and faculty in comprehensive and liberal arts colleges are more likely to say they are primarily interested in teaching.

Discipline: Publication productivity varies widely between disciplines (Baird, 1991). Faculty may select disciplinary cultures where what is rewarded most closely resembles their own intrinsic interest. Specifically, I predict that faculty in natural sciences, social sciences, and math departments are more likely to say they are primarily interested in research, and faculty in humanities and foreign languages departments are more likely to say they are primarily interested in teaching.

Individual Background Variables: Both demographic or ascriptive characteristics and evidence of achievement or demonstrated success at a task are likely to influence an individual's preference for one task over another.

Gender and Ethnicity: There are relatively few female and minorities in academia compared to white men. In addition, a disproportionate number of women and minorities work part-time or serve in lower academic ranks (Bowen & Schuster, 1986). Those who are promoted to tenure may feel special interest in teaching, advising and generally serving as a role model for female or minority students (Taylor & Martin, 1987). These other pressures may reduce the effects of the extrinsic reward of tenure on women and minority faculty members' preferences for teaching or research.

Career age, the number of academic years a professor has been employed full time in higher education, may affect faculty preference in either of two ways. Perhaps the closer a professor is to his or her own receipt of tenure, the more that the professor's allocation of time will be affected by what tasks he or she perceives are important for tenure. On the other hand, research done on the life-stages of faculty members has shown that professors' interest in teaching may increase the closer they get to retirement (Baldwin & Blackburn, 1981).

Demonstrated success at a task is very likely to have positive effects on an individual's interest in continuing to perform the task. Faculty *rank* is an indication of demonstrated success to the degree that merit is an important component of the promotion from associate to full professor (Clark, 1987). Of course, seniority also may be an element in decisions to promote tenured associates to the status of full professors, so rank is likely to have some correlation with career age. Meritorious performance of the tasks that lead to tenure are also likely to lead to promotion to full professor within a department.

There is more agreement in academia about criteria for evaluating quality in research than there is for evaluating quality teaching. For this study, evidence of *demonstrated success in research* is defined in terms of number of publications. Standards for assessing teaching such as student evaluation ratings or number of

teaching awards earned are rarely comparable across institutions or disciplines. Therefore, this study does not include a measure for demonstrated success in teaching.

Hypotheses

Does Tenure Increase Interest in Both Teaching and Research? Much of the recent flurry of criticism of faculty behavior is based on the assumption that external rewards are positively related to faculty interest in teaching and research. The critics charge that faculty have been seduced by the superior rewards offered for research into increasing the time they devote to research As a result, professors are spending less time and effort on teaching, and the quality of undergraduate education is declining. (Smith, 1990; Sykes, 1988). Massy & Wilger (1991) suggest that the shift in faculty effort can be compared to a change in an industry's product mix, and that the "output creep" in higher education from teaching to research evolved gradually since World War II. Moreover, shifts in faculty research behavior are influenced more and more by state and federal agencies and by private industry (Anderson and Louis, 1991). Apparently, several influential leaders agree that this shift is occurring. Furthermore, they imply that the output creep toward research can be stopped, or at least slowed, by changing the rewards offered to professors. Derek Bok, former president of Harvard, argues that restoring a more effective balance between teaching and research depends on improving the rewards and incentives for good teaching (1990). In 1991, Donald Kennedy, former president of Stanford University, announced a $7 million program to provide incentives to faculty to improve undergraduate instruction in the School of Humanities and Sciences. Implicit in such policies is the assumption that external rewards will stimulate professors' interest, so they will be more interested in devoting effort to those activities that they perceive are the best rewarded.

Both inducements-contributions theories (Barnard,1938); March and Simon,1958), and expectancy theories of motivation (Vroom,1964); Lawler, 1973)

support the assumption of a positive relationship between extrinsic rewards, intrinsic motivation, and interest. Both theoretical frameworks are based on a hedonistic model of human motivation. According to inducements-contributions theory, organizations offer material (e.g. salary) and non-material (e.g. recognition, collegial relationships) inducements to convince individuals that their self-interest will be well-served by contributing to the organization. Expectancy theories assume that individuals operating in their own self interest make conscious decisions between alternative choices. These decisions are based on their beliefs about and their preferences for the expected outcomes of their behaviors. Applying these theories to faculty motivation, we would expect that, if professors perceive that teaching tasks are rewarded by tenure better than research tasks, their intrinsic motivation to teach will be enhanced, and they will be more interested in teaching than research. If they perceive that research tasks are rewarded by tenure better than teaching tasks, their intrinsic motivation to do research will be enhanced, and they will be more interested in research than teaching. This would predict a positive relationship between their perceptions that teaching tasks are important for tenure and their interest in and preference for teaching over research. It would also predict a negative relationship between faculty perceptions that research tasks are important for tenure and their interest in and preference for teaching over research. Formally stated:

> **Hypothesis 1:** Other things being equal, the *more* that professors perceive that teaching tasks are relatively important for attaining tenure, the *more* likely they are to state they prefer teaching over research. The *more* that professors perceive that research tasks are relatively important for attaining tenure, the *less* likely they are to state they prefer teaching over research.

Does Tenure Decrease Interest in Teaching and Increase Interest in Research ?

Intrinsic motivation has been used as an explanation for why faculty continue to teach

even though they are better rewarded for research. (Cook et. al., 1990; Mowday, 1982). Some theorists suggest that increasing extrinsic rewards for teaching will decrease intrinsic motivation to teach effectively (Bess, 1977; Deci & Ryan, 1982). McKeachie (1979) states that professors' joy in teaching will decrease as they pursue ever greater external rewards, and that their interest in doing a task well for its own sake will decline. This argument implies a negative relationship between extrinsic rewards and interest in teaching. It is interesting that no one suggests that reducing extrinsic rewards for research will decrease interest in research!

In his discussion of The Academic Life (1987), Burton Clark suggests that extrinsic rewards do, in fact, have different effects on faculty interest in teaching than they do on faculty interest in research (Clark, 1987). Intrinsic rewards from teaching compensate professors for "diminished material rewards" (p. 222). On the other hand, the incentives that promote research are necessary to keep the higher education system dynamic. This implies that professors' interest in teaching will not be affected by extrinsic rewards, but extrinsic rewards will have a positive effect on their interest in research.

Theoretical justification is provided by Deci and Ryan's cognitive evaluation theory (1982) which suggests that extrinsic rewards decrease intrinsic motivation when individuals perceive the rewards are used to control their behaviors and decrease their autonomy. Extrinsic rewards may add to intrinsic motivation when individuals perceive that the rewards reinforce their autonomy and recognize their competence. With few exceptions, tenure carries a stronger contractual obligation to teach than to do research, since teaching tasks are more directly regulated than research tasks. The term, faculty "work load" usually is used to indicate professors' formal teaching obligation. It is often defined as the number of hours per week or courses per term a professor is required to teach by his or her institution. In contrast, faculty choose to engage in research during the time they are freed from teaching obligations (Clark,

1987). Even if research and publication had been necessary for a professor to attain tenure, once tenure is achieved, these tasks are not contractually required to the same degree as teaching. Thus faculty are more likely to feel controlled by tenure to the extent they perceive it is awarded for teaching. To the extent they perceive tenure is awarded for their performance of research, they are more likely to feel the reward enhances their self-competence and self-determination.

According to cognitive evaluation theory, we would expect that professors' interest in teaching for its own sake will decrease if they perceive that teaching tasks are important for securing the external reward of tenure. In contrast, professors' interest in research for its own sake will increase if they perceive that research tasks are important for securing the external reward of tenure. This would predict a null or negative relationship between their perceptions that teaching tasks are important for tenure and their interest in and preference for teaching over research. It would also predict a negative relationship between faculty perceptions that research tasks are important for tenure and their interest in and preference for teaching over research. Formally stated:

> **Hypothesis 2:** Other things being equal, the *more* that professors perceive that teaching tasks are relatively important for attaining tenure, the *less* likely they are to state they prefer teaching over research. The *more* that professors perceive that research tasks are relatively important for attaining tenure, the *less* likely they are to state they prefer teaching over research.

Data

Sample

The data in this analysis was taken from the 1989 Survey Among College and University Faculty performed by the Wirthlin Group for the Carnegie Foundation for the

Advancement of Teaching. The total sample consisted of 5,450 faculty members (response rate 54.5%) from 306 representative 2-year and 4-year American colleges and universities. For this study, a specific subgroup of 1,504 represent those faculty with 1) a regular full-time teaching appointment at a university or four-year college, 2) a rank of assistant, associate, or full professor, 3) tenure, or on a tenure track, 4) current teaching responsibilities in one of the following groups of departments in humanities and sciences: natural sciences, social sciences, humanities, foreign languages, or math.

Measures

Dependent Variable--Intrinsic Interest: Interest in either teaching or research was assessed from responses to the question: Do your interests lie primarily in research or teaching? Possible responses included, "Primarily in research," "In both, but leaning toward research," "In both, but leaning toward teaching," and "Primarily in teaching." Table 1 gives the numbers and percentages of the responses to this question. To assess faculty interest in one activity more than the other, I recoded the responses into a dichotomous variable with a value of 0 indicating primary interest in research (40.4 % of respondents), and a value of 1 indicating primary interest in teaching (59.6% of respondents).

(Insert Table 1 about here)

Importance of Tasks for Tenure:

Faculty perceptions of the *importance of teaching tasks to attaining tenure* were assessed by adding the following five responses to the question, how important are the following for granting tenure in your department? 1) Syllabi for courses taught, 2) recommendations from current or former students, 3) observations of teaching be colleagues and/or administrators, 4) student evaluations of courses taught, and 5) academic advisement. Responses to these questions were on a Likert-type scale ranging

from 1 = very important to 4 = very unimportant. A response of 5 indicated no opinion. Most professors assigned a value to at least one of the five tasks, however. For the purpose of this analysis, I recoded "no opinion" and missing responses as 0. I also recoded the direction of scale so that "very important" was equal to 4 . The composite variable, then, indicating a faculty member's perception of the importance of teaching tasks for attaining tenure was scaled from 0 to 20.[2] The mean for this sample was 10.9 with a standard deviation of 4.0..

Faculty perceptions of the *importance of research tasks for attaining tenure* were assessed by adding the following five responses to the question, how important are the following for granting tenure in your department? 1) the number of publications, 2) the type of publications (books, edited volumes, articles), 3) published reviews of the scholar's books, 4) the reputations of the presses or journals publishing the books or articles, and 5) research grants received by the scholar. As for teaching, responses to these questions were on a Likert-type scale ranging from 1 = very important to 4 = very unimportant. A response of 5 indicated no opinion. Most professors assigned a value to at least one of the five tasks, however. For the purpose of this analysis, I recoded "no opinion" and missing responses as 0. I also recoded the direction of scale so that "very important" was equal to 4 . The composite variable, then, indicating a faculty member's perception of the importance of research tasks for attaining tenure was scaled from 5 to 20.[3] The mean for this sample was 12.9 with a standard deviation of 3.8.

Context variables: The Carnegie Foundation has classified American institutions of higher education into nine categories on the basis of the level of degree offered, the comprehensiveness of their missions, and their level of federal research funding (Boyer, 1989). For this study, I have grouped the eight categories representing universities and four-year colleges into four types of institutions. From the selected sample of 1504 for this study, 379 faculty are employed at *Research Universities,* which offer a full range of baccalaureate program, are committed to graduate education

through the doctorate degree, give high priority to research, and receive more than $12.5 million in federal support. *Doctoral-granting universities,* at which 374 of the sample are employed, also offer a full range of baccalaureate programs and annually award at least 10 Ph.D. degrees in three or more disciplines. *Comprehensive colleges,* at which 371 of the sample are employed, offer baccalaureate programs and graduate education through the master's degree. More than half the B.A. degrees are awarded in two or more occupational or professional disciplines. *Liberal arts colleges,* at which 380 of the sample are employed, enroll primarily undergraduates and award more than half their B.A. degrees in liberal arts fields. The proportion of the sample employed in each Carnegie institution type is found in Table 2.

Since this study is being performed in conjunction with a study about productivity of academic departments currently being done by William Massy at Stanford University and Robert Zemsky at Penn State University, I selected faculty who reported that their teaching appointments are in disciplines that correspond with the departments used in Massy's and Zemsky's studies. The number of faculty from each of these departments is 1) 434 from social sciences (including anthropology, political science, sociology, social work, economics, and psychology), 2) 390 from natural sciences (including biological/life sciences and physical sciences), 3) 430 from humanities, 4) 134 from math, and 5) and 122 from foreign languages. The proportion of the sample in each of these five disciplinary fields is listed in Table 2.

(Insert Table 2 about here)

Individual background variables: Demographic information about *gender* (female N=261), *race* (nonwhite N=75), was obtained directly from the faculty survey responses. I found it particularly interesting that the response rate for assistant professors for the overall sample was particularly low (151 out of 5,450). In the subsample originally selected for this study, only one respondent was an assistant professor. Unfortunately, this prevented any comparison of pre-and post-tenure

perceptions of what is important for tenure, and this one case was dropped from the analysis. Therefore, I coded *rank*, as a dummy variable with 1 signifying tenured associate and 0 signifying tenured full professors. The proportion of the sample who are female, nonwhite, or associate professors is listed in Table 2.

I also included a measure of number of academic years that the individual professor had been employed full time in higher education. Perhaps the closer that a professor is to his or her own receipt of tenure, the more that the professor's allocation of time will be affected by what tasks he or she perceives are important for tenure. Among the 589 associate professors in the subsample, the mean number of years of full-time employment in higher education was 16.4 with a standard deviation of 7.14. Among the 915 full professors in the subsample, the mean number of years of full-time employment in higher education was 23.7 with a standard deviation of 7.19. I was concerned that there would be a multi-collinearity problem between years employed in higher education and rank of associate professor, the correlation is smaller than I expected ($r = -.461$). Including years employed in higher education in the analysis did increase the explanatory power of the models; removing it did not have a large impact on the significance or magnitude of the effects of the rank of associate or on other variables.

Demonstrated success at research was assessed from two indicators derived from the survey. The number of publications in a faculty member's lifetime was derived by adding the responses to three questions: 1) how many articles have your ever published in academic or professional journals, 2) how many articles how you ever published in edited collections or volumes, and 3) how may books or monographs have you ever published or edited, alone or in collaboration. Recent demonstrated success in research was assessed by responses to the question: how many of your professional writings have been published or accepted for publication in the past two years? I removed from the analysis the five cases where responses seemed beyond human capacity (lifetime articles published > 900; lifetime books published > 190; articles published in the last two

years > 70). The means and standard deviations of the demonstrated success in research and years employed in higher education variables are listed in Table 3.

(Insert Table 3 about here)

Probit and Logit Models

In this analysis, I use and compare two statistical models to assess the effects of context, individual background, and perceived reward variables on the dichotomous outcome: faculty members' stated primary interest in research or in teaching. Two versions of nonlinear probability models fitting the data in this study, logit and probit, are presented in Table 5; both are estimated using maximum likelihood estimation methods. Both Logit and Probit models suggest that the relationship of the independent variables to the dependent dichotomous variable is sigmoid, or S-shaped rather than linear.

Probit

The probit model is based on the assumption that the discrete outcome variable is an indicator of some unobserved metric variable. In this case, we know from the original four-point scale coding of primary interest, that preference for teaching and preference for research are gross indicators on what could be imagined as a continuum measuring degree of preference. The dichotomous outcome simply marks the threshold where a professor feels inclined to state that he or she prefers one activity more than the other. Individuals are assumed to respond in varying degrees to context, individual background, perceived reward and unknown other factors that shape preferences and tip them over their unique thresholds of preferring research or teaching. Probit assumes that the distribution of these thresholds is normal, so the probability function is a cumulative normal density curve. Probit always predicts probabilities between 0 and 1, and is estimated by maximum likelihood. The coefficients for the probit estimates are listed in Table 4. The significance and direction of the effects of the context,

individual background, and perceived reward variables are discernable from these coefficients. However, to assess the magnitude of the effects, I transformed the coefficients to determine the change in probability for a one-unit change in each variable, holding the other variables constant. The results of these transformations, assuming the mean value of each independent variable, are shown as compared to the results from the logit model in Table 5.

(Insert Table 4 about here)

Logit

The logit model is based on the idea of the odds that Y equals 1 rather than 0. Thus in this study, the logarithm of the odds that a professor prefers teaching to research is a linear function of the effects of context, individual background, and perceived reward variables. The logistic curve is also sigmoid or S-shaped, and always predicts probabilities between 0 and 1. Logit is also estimated by maximum likelihood. The coefficients for the logit estimates are listed in Table 4. Again, the significance and direction of the effects of the context, individual background, and perceived reward variables are discernable from these coefficients. However, to assess the magnitude of the effects, I transformed the coefficients to determine the change in probability for a one-unit change in each variable, holding the other variables constant. The results of these transformations, assuming the mean value of each independent variable, are shown as compared to the results from the probit model in Table 5.

Results

Maximum Likelihood Estimates

In Table 4, I report the logit and probit estimates with their standard errors for three cumulative models of the effects of context, individual background, and perceived

reward variables on professors' stated primary interest in either research or teaching. The direction and significance of the effects of the independent variables are quite similar across both models.

Model I in Table 4 presents a baseline model examining only the effects of the context variables institution type and disciplinary field. Type of institution has significant effects on primary intrinsic interest in the predicted direction in both the logit and probit models. Professors at doctoral-granting universities are slightly more likely to express a primary interest in teaching rather than research than are professors at research universities. Professors at comprehensive and liberal arts colleges are much more likely to express a primary interest in teaching rather than research. According to the logit and probit models, only foreign languages faculty are significantly more likely to prefer teaching to research as compared to natural sciences faculty.

Model II examines whether the effects of context factors can be empirically differentiated from individual ascriptive and achievement factors. Variables for gender, race, years employed full time in higher education, rank, and demonstrated success in research (number of publications in one's professional lifetime, and number of publications in the last two years) were added to the baseline context model. The results indicate that, when controlling for individual background characteristics, institution type continues to have important influence on faculty preference for teaching or research. Except for foreign languages, disciplinary field does not have a significant effect. As predicted, the logit and probit models show that demonstrated success in research, both over one's professional lifetime and in the recent past, is significantly and negatively associated with primary interest in teaching. Interestingly, both the rank of associate professor and increasing number of years employed in higher education have significant positive effects on interest in teaching. Perhaps this indicates that the longer since a professor or either rank has been promoted, the less he or she feels

pressure to publish. Gender and race have no significant effects on primary interest in teaching or research. For the logit and probit models, the likelihood ratio of the simpler model to the model with additional variables yields an estimated chi-squared that is significant at the .001 level. Thus Model II is a significant improvement over the fit of Model I.

Model III introduces the variables for importance of tasks for tenure. These include professors' perceptions of the degree to which teaching tasks and research tasks contribute to attaining tenure in their departments. In both the logit and probit models, the dummy variables for Carnegie institution-type retain their significance and direction of effect when the importance of task for tenure variables are added. Again, the only disciplinary field that is significantly different from natural sciences is foreign languages. Preferences of female or non-white professors are not significantly different from preferences of male or white professors. Increasing number of years employed in higher education continues to have significant positive effects on faculty preference for teaching in both the logit and probit models. The effect of rank of associate professor as compared to full professor is not significant in the logit model but is significant and positive in the probit model. Demonstrated success in research, both over one's professional lifetime and in the recent past, continues to be significantly and negatively associated with primary interest in teaching in both models.

Professors' perceptions of the important of teaching and research tasks for attaining tenure do have significant effects on their interests in these tasks, even when controlling for the work context and individual background factors. Faculty perceptions of the importance of teaching tasks for attaining tenure have significant positive effects on preference for teaching over research. Faculty members' perceptions of the importance of research tasks for attaining tenure have significant negative effects on preference for teaching over research. The more a professor perceives teaching tasks are relatively important for attaining tenure, the higher the probability he or she will

prefer teaching. The more a professor perceives research tasks are relatively important for attaining tenure, the lower the probability he or she will prefer teaching.

For the logit and probit models, the likelihood ratio of the simpler model to the model with additional variables yields an estimated chi-squared that is significant at the .01 level. Thus Model III is a significant improvement over the fit of Model II.

"Average" Proportional Change Scores

Table 5 presents the proportional change scores, computed at the means of the independent variables, for the logit and probit models. These results illustrate that, as with significance and direction, logit and probit models' estimates of the the magnitude of the effects of the independent variables on preference for teaching or research are similar. The proportional change scores indicate the effect of a one-unit change in each independent variable, holding the others constant at their mean scores, on the probability of preferring teaching to research. For example, every one-unit increase on a 0 to 20 scale in the "average" professor's perception that teaching tasks are important for attaining tenure in his or her department, increases the probability that this professor will prefer teaching to research by about 1.2%, all other things being equal (1.2% according to the logit model, and 1.1% according to the probit model) . Similarly, every one-unit increase on a 0 to 20 scale in the "average" professor's perception that research tasks are important for attaining tenure in his or her department, decreases the probability that this professor will prefer teaching to research by about 1.5%, all other things being equal. (1.3% according to the logit model, and 1.5% according to the probit model). This finding substantiates the first hypothesis: Other things being equal, the *more* that professors perceive that teaching tasks are relatively important for attaining tenure, the *more* likely they are to state they prefer teaching over research. The *more* that professors perceive that research

tasks are relatively important for attaining tenure, the *less* likely they are to state they prefer teaching over research.

(Insert Table 5 about here)

The magnitude of proportional change scores is quite similar for the logit and probit models. The logit and probit models estimate that each additional article published by the "average" professor in the last two years decreases the probability that that professor will prefer teaching by about 5% (5.7% for logit, 4.7% for probit). For each year that the "average" professor works in academia, the probability that he or she will prefer teaching increases by about 1.2% (1.3% for logit, 1.1% for probit). This may indicate a cohort effect; older professors trained before the thrust of the research imperative (Gumport, 1990) were more likely to have been socialized to the profession when teaching was valued and rewarded more than it has been in the last twenty years. However, the effect of increasing years holds, net of rank, perhaps indicating that the more experience professors have with teaching, the more they enjoy it. Again, gender and race have no significant effects on primary interest in teaching or research.

The type of institution where professors work has the most dramatic effects on whether they prefer teaching or research suggesting that selection and/or socialization effects. The odds that the "average" professor at a doctoral-granting university will prefer teaching more than the "average" professor at a research university are about range from about 12.5 % in the logit model to about 14% in the probit model. The odds that the "average" professor at a comprehensive college will prefer teaching more than the "average" professor at a research university are about range from about 26.5 % in the logit model, to about 28% in the probit model. The odds that the "average" professor at a liberal arts college will prefer teaching more than the "average" professor at a research university are about range from about 30 % in the logit model, to about 31%. According to the logit and probit models, there is only one significant disciplinary

effect: the odds that foreign languages faculty prefer teaching more than natural sciences faculty are about 15%.

Hypothetical Examples of Proportional Change

While the proportional change scores provide a way to compare the results of the three statistical models, it is intuitively difficult to imagine an individual working in the "average" discipline at the "average" institution of higher education who is of the "average" gender, race and rank. Therefore, I also calculated proportional change scores for two hypothetical individuals.

Consider the case of a female full professor of French who has been employed at her comprehensive college for 25 years. Her perceptions that research tasks are important for attaining tenure are important in her department are below the mean of 12.9 for the sample (10 on a scale of 0 to 20) and her perceptions that teaching tasks are important for attaining tenure are important in her department are above to the mean of 10.9 for this sample (16 on a scale of 0 to 20). She has produced 12 publications in her academic career, one of them in the last two years. Given that she is a professor in a foreign languages department that rewards teaching more tan research in a comprehensive college, we might expect the probability she will prefer teaching to research will be high, and it is. According the the logit model, the probability that she will prefer teaching is .875; according the the probit model, the probability that she will prefer teaching is .878. These predicted probabilities are quite a bit higher than the predicted probabilities of the "average" cases (.59 for logit and .60 for probit).

In contrast, consider the case of a male math professor who has just attained tenure and the rank of associate professor after working at his doctoral-granting university for 8 years. His perceptions that research tasks are important for attaining tenure are important in his department are relatively high (16 on a scale of 0 to 20) and his perceptions that teaching tasks are important for attaining tenure are important in his department are close to the mean for this sample (10 on a scale of 0 to 20). He

has published 24 articles in his academic career, 3 of them in the last two years. Given that he is a professor with demonstrated success in research in a department that rewards research more than teaching in a doctoral-granting university, we might expect him to prefer research. However, according the the logit model, the probability that he will prefer teaching is .563; according the the probit model, the probability that he will prefer teaching is .589. These predicted probabilities are only slightly lower than those of the "average" cases: .59 for logit and .60 for probit. This hypothetical case is a reminder that even though more faculty in this sample feel they research tasks are important for tenure than teaching tasks, more also say they prefer teaching. This study shows, however, that tenured professors' perceptions that teaching is rewarded by tenure are positively related to their interest in teaching. Thus a negative relationship between extrinsic rewards and intrinsic interest is not a likely explanation for this apparent dissonance. Just what might explain the dissonance is a subject for further study.

Discussion

The results of this study show that, even after they have attained tenure themselves, faculty perceptions of which tasks are rewarded by tenure continue to influence their intrinsic interest in their professorial tasks. Moreover, net of the effects of work context and individual background, the positive influence of tenure has approximately the same magnitude on tenured professors' primary interest in teaching as it does on their primary interest in research. To the extent that faculty perceive research is rewarded by the key gatekeeping academic reward of tenure, their preference for research over teaching increases . Similarly, to the extent that faculty perceive that teaching is rewarded in their departments by tenure, their preference for teaching increases rather than decreases.

These findings substantiate the assertion that professors' perceptions of which tasks are important for attaining tenure in their departments affect their interest in those tasks after they have already received tenure. Thus, the reward of tenure has lasting socializing effects on the individual professor as well as junior colleagues in the department where he or she works. Once tenured, a professor reinforces the preferences adopted during his or her own probationary period when prioritizing the tasks considered important for evaluating new candidates.

Furthermore, the findings support the predictions derived from inducements-contributions and expectancy theories in Hypothesis 1: an individual's interest in a task is positively related to her or his perception that performance of that task contributes to receiving an extrinsic reward. This holds true for faculty whether the task in question is teaching or research. The results, then, do not support the assertions leading to Hypothesis 2 that increasing extrinsic rewards for teaching will decrease intrinsic interest in teaching.

The implications for policy makers are clear: tenured professors' interest in teaching is enhanced when they perceive that specific evidence of effort in teaching contributes to attaining tenure in their departments. The same, of course, holds true for their interest in research. The positive effect on interest of faculty perceptions that specific teaching or research tasks lead to the reward of tenure is relatively small, however. The sorting that occurs at time of hiring has a much greater effect on the probability that a professor will prefer teaching or research.

This study shows that professors' primary interests are strongly aligned with the missions of the institutions where they work. Institution type is the strongest predictor of whether faculty are more interested in teaching or research. It appears that, in general, faculty who prefer teaching to research both select and are selected by those institutions where teaching tasks are given more weight in tenure decisions. Given that 20 is mean number of years employed in higher education for this sample, socialization

processes may be involved. Over time, professors come to adopt their institutions' values as to what is important as their own.

In contrast, with the exception of foreign languages faculty, discipline has no significant effects on whether faculty prefer to teach or to do research. It is interesting that neither gender nor ethnicity have significant effects on professors' preference for teaching over research. Earlier studies have shown that gender and ethnicity do affect administrators' decisions about size of salary increases (e.g. Astin & Bayer, 1973, Ferber, 1974; Katz, 1973) and that women publish more and teach less than men (Blackburn, Behymer & Hall, 1978). However, this study shows that once work context is controlled for, women's and minorities' interests in their professorial tasks are no different from their white male colleagues.

Future Study

Based on this foundation, I see three areas for future study. The first is a study of the effect of assistant professors' perceptions of what tasks are important for tenure on their stated primary interest in teaching or research. Thus we could see if the reward of tenure has more or less effect before it has been received as compared to after it has been received.

The second area for future research builds on this exploratory study of how faculty respond to tenure. We need to know more about how faculty respond to other rewards as well. Most earlier studies of the relation between teaching, research and and rewards focus on salary and give information about what administrators value when determining salary increases. However, salary and tenure are not the only academic rewards that may affect professors' interests. The effect of a change in any one reward may vary greatly depending on the overall reward structure facing faculty. The offer of a one-time bonus of $3,000 for outstanding teaching, for example, may have different impacts on an assistant professor facing immanent tenure review at a large research

university, than on an assistant professor at a liberal arts college with a small faculty. With William Massy, I have begun a study of the collective impact of academic rewards on faculty interest, including advancement, special salary supplements, teaching or research awards, consulting fees, formal recognition from a disciplinary association, sabbaticals, and travel grants.

Finally, most of our knowledge about faculty and rewards comes from survey data. While this information is certainly useful, we know little about **how** and even less about **why** faculty respond the way they do to institutional and disciplinary influences and rewards. We still don't know why professors who feel they are rewarded more for research say they prefer teaching, or the degree to which that preference affects their effort devoted to these two tasks. One reason is that existing data on effort comes from survey questions asking faculty to estimate the amount of time they spend on their professorial tasks. Similar self-reported estimates of time use by managers have been shown to be quite inaccurate. Simple estimates of time allocation also obscure the complexity and the possible overlaps between teaching, research, and service tasks. My dissertation is an effort to address this issue. It includes behavioral data of faculty time use obtained from structured observations of twelve professors. I will obtain their perceptions of the effect of institutional, departmental, disciplinary, and extra-academic influences on their allocation of time from in-depth interviews.

Notes

1 Blackburn, et.al, (1991), found that rank, which is correlated with tenure, has no effect on time faculty devote to teaching.

2 Only 11 respondents, or .7% of the sample assigned no value to the importance of any teaching task for tenure. I included these cases in the analysis.

3 Only 15 respondents, or 1% of the sample assigned no value to the importance of any research task for tenure. I included these cases from the analysis.

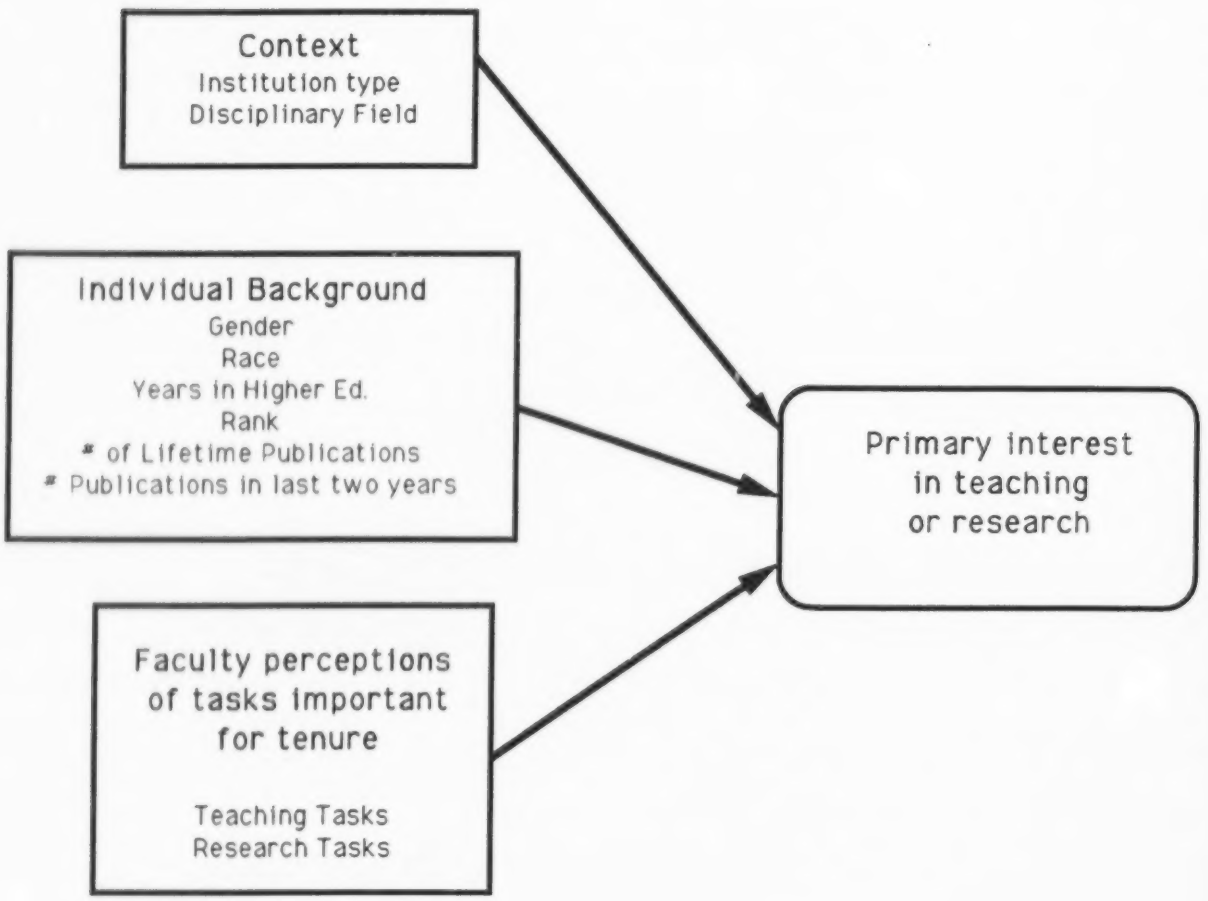

FIGURE 1:
Effects of Work Context, Individual Background, and Perceived Importance of Tasks for Tenure on Faculty Preference for Teaching or Research

TABLE 1: Frequencies and percentages of responses to the 1989 Carnegie Faculty Survey question, "Do your interests lie primarily in research or in teaching?

Response	*Frequency*	*Percent*
1 Primarily in research	125	8.3
2 In both, but leaning toward research	483	32.1
3 In both, but leaning toward teaching	488	32.5
4 Primarily in teaching	408	27.1

NOTE: Data from a selected subsample of 1504 from the 1989 Carnegie Foundation Faculty Survey

TABLE 2: Variable Names and Proportions of Dichotomous Independent Variables[a]

Name	*Proportion*
Context Variables	
Institution type	
Research Universities[b]	.25
Doctoral-granting Universities	.25
Comprehensive Colleges	.25
Liberal Arts Colleges	.25
Disciplinary Field	
Natural Sciences[c]	.26
Social Sciences	.29
Humanities	.29
Math	.09
Foreign Languages	.08
Individual Background Variables	
Gender (female=1)	.17
Race (nonwhite=1)	.05
Rank (Assoc=1, Full=0)	.39

NOTES: [a] Data from a subsample of 1,504 professors from the 1989 Carnegie Foundation Faculty Survey
[b] For analysis, Research University will be omitted category from Institution Type
[c] For analysis, Natural Sciences will be omitted category from Disciplinary Field.

TABLE 3: Means and Standard Deviations of Interval Independent Variables [a]

	Mean	Standard Deviation
Years employed in Higher Education (1-44)	20.8	8.0
Lifetime Number of Publications (0-402)	24.3	33.5
Number of Publications in last 2 years (0-70)	3.2	4.6
Perceived Importance of Research Tasks for Tenure (interval scale 0-20)	12.9	4.0
Perceived Importance of Teaching Tasks for Tenure (interval scale 0-20)	10.9	3.8

NOTE: [a] Data from a subsample of 1,504 professors from the 1989 Carnegie Foundation Faculty Survey

TABLE 4: Logit and Probit Models of the Effects of Context, Individual Background, and Tenure on Faculty Preference for Teaching Over Research [a]

	I		II		III	
	LOGIT	PROBIT	LOGIT	PROBIT	LOGIT	PROBIT
Context Variables						
Doctoral-granting Univ.[b]	1.028*** (.155)[d]	.634*** (.095)	.562*** (.179)	.398*** (.104)	.516*** (.180)	.366*** (.105)
Comprehensive Colleges	2.296*** (.174)	1.405*** (.101)	1.402*** (.204)	.945*** (.117)	1.097*** (.220)	.737*** (.126)
Liberal Arts Colleges	2.224*** (.171)	1.356*** (.101)	1.607*** (.201)	1.046*** (.114)	1.250*** (.223)	.813*** (.128)
Social Science[c]	.189 (.156)	.114 (.093)	.061 (.183)	.055 (.103)	.119 (.185)	.096 (.105)
Humanities	.160 (.157)	.092 (.094)	-.172 (.186)	-.037 (.105)	-.172 (.187)	-.030 (.106)
Math	.399 (.225)	.238 (.135)	-.123 (.258)	-.020 (.146)	-.105 (.259)	-.013 (.148)
Foreign Languages	.988*** (.252)	.578*** (.147)	.636* (.287)	.409* (.160)	.649** (.287)	.423** (.162)
Individual Background Var.						
Gender (female=1)			-.109 (.183)	-.040 (.104)	-.096 (.186)	-.029 (.106)
Race (nonwhite=1)			-.449 (.308)	-.245 (.175)	-.436 (.309)	.232 (.176)
Years in Higher Ed.			.048*** (.010)	.027*** (.006)	.052*** (.011)	.030*** (.006)
Rank (Assoc=1, Full=0)			.238 (.160)	.185* (.091)	.316 (.163)	.231* (.093)
Lifetime # Publications			-.023*** (.004)	-.009*** (.002)	-.022*** (.004)	-.008*** (.002)
# Publications/last 2 yr			-.243*** (.031)	-.124*** (.017)	-.236*** (.032)	-.121*** (.017)
Imprtnce Tasks for Tenure						
Imprtnce Research/Tenure (interval scale 0-20)					-.053* (.021)	-.038** (.012)
Imprtnce Teach./Tenure (interval scale 0-20)					.051* (.020)	.029* (.012)
Likelihood Ratio X^2	1726.1	1726.3	1408.1	1438.2	1394.5	1420.1
df	1496	1496	1490	1490	1488	1488
N	1504		1504		1504	

* p < .05 **p < .01 ***p < .001

NOTES: [a] Data from a subsample of 1,504 from the 1989 Carnegie Foundation Faculty Survey
[b] Omitted institution type is research university
[c] Omitted disciplinary field is natural sciences
[d] Standard errors are in parentheses

(Colbeck 11/92)

TABLE 5: Effects of Unit Changes in Context, Individual Background, and Tenure Variables on Probability of Change in Faculty Preference for Teaching Over Research (Derived from Logit and Probit Estimates)[a]

	LOGIT[d]	PROBIT[d]
Work Context Variables		
Doctoral-granting Universities[b]	.125***	.141***
Comprehensive Colleges	.265***	.284***
Liberal Arts Colleges	.302***	.313***
Social Science[c]	.029	.037
Humanities	-.042	-.011
Math	-.025	-.005
Foreign Languages	.157*	.163*
Individual Background Variables		
Gender (female=1)	-.023	-.011
Race (nonwhite=1)	-.105	-.090
Years employed in Higher Education	.013***	.011***
Rank (Assoc=1, Full=0)	.076	.090*
Lifetime Number of Publications	-.005***	-.003***
Number of Publications in last 2 years	-.057***	-.047***
Perceived Importance of Task for Tenure.		
Importance of Research for Tenure (interval scale 0-20)	-.013*	-.015**
Importance of Teaching for Tenure (interval scale 0-20)	.012*	.011*
Predicted mean probability (actual mean is .596)	.59	.60
N = 1,504		

* p < .05 **p < .01 ***p < .001

NOTES: [a] Data from a subsample of 1,504 from the 1989 Carnegie Foundation Faculty Survey

[b] Omitted institution type is research university

[c] Omitted disciplinary field is natural sciences

[d] Assumes mean value of each independent variable.

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